

CLAIMS

What is claimed is:

1. A method for remediating an explosive device, if the explosive device once installed at a predetermined detonation site fails to detonate as intended, said method comprising the steps:
 - (a) forming a quantity of an explosive material into an explosive device;
 - (b) identifying microorganisms capable of bioremediating said explosive material;
 - (c) shaping a quantity of said microorganisms into aggregations having a form selected from the group consisting of a pellet, a capsule, a shard, a flake, a granule, a powder, and a clump;
 - (d) positioning said aggregations in such proximity to said quantity of said explosive material that, if said explosive device fails to detonate as intended, said microorganisms in said aggregations deactivate said explosive device by commencing bioremediation of said quantity of said explosive material; and
 - (e) placing the explosive device at a predetermined detonation site, whereby said explosive material is bioremediated if said explosive device fails to detonate as intended.
2. A method as recited in Claim 1, wherein said step of forming occurs before said step of positioning.

3. A method as recited in Claim 2, wherein said step of positioning comprises the step of depositing said aggregations on an exposed surface of said explosive material in said explosive device.

4. A method as recited in Claim 2, wherein said step of forming comprises the step of disposing said quantity of said explosive material in a shell, and wherein said shell enables water from the exterior of said shell to flow through said shell into contact with said quantity of said explosive material.

5. A method as recited in Claim 4, wherein said step of positioning comprises the step of depositing said aggregations on a surface of said quantity of said explosive material in said shell.

6. A method as recited in Claim 4, wherein said shell is porous, and said step of positioning comprises the step of embedding said aggregations in said shell.

7. A method as recited in Claim 4, wherein said step of positioning comprises the step of inserting into said quantity of said explosive material in said shell a longitudinal core of said aggregations.

8. A method as recited in Claim 1, wherein said explosive material in said explosive apparatus is porous.

9. A method as recited in Claim 1, wherein a surfactant is mixed with said explosive material.

10. A method as recited in Claim 1, wherein said step of positioning occurs before said step of forming.

11. A method as recited in Claim 10, wherein said step of positioning comprises the step of dispersing said aggregations in said quantity of said explosive material.

12. A method as recited in Claim 10, further comprising the step of introducing thermal protective additives into said aggregations.

13. A method for remediating an explosive device, if the explosive device once installed at a predetermined detonation site fails to detonate as intended, said method comprising the steps:

- (a) forming a quantity of an explosive material into an explosive device;
- (b) identifying microorganisms capable of bioremediating said explosive material;
- (c) housing a quantity of said microorganisms in a bioremediation apparatus;
- (d) coupling said bioremediation apparatus to said explosive device; and
- (e) placing the explosive device at a predetermined detonation site, whereby said explosive material is bioremediated if said explosive device fails to detonate as intended.

14. A method as recited in Claim 13, wherein said step of forming comprises the step of disposing said quantity of said explosive material in a shell, and wherein said shell enables water from the exterior of said shell to flow through said shell into contact with said quantity of said explosive material.

15. A method as recited in Claim 14, wherein said shell has an open end, a capwell positioned at said open end, and a bioremediation portal formed through said capwell communicating with said explosive material in said shell.

16. A method as recited in Claim 13, wherein said bioremediation apparatus comprises:

- (a) storage means for releasably containing said microorganisms; and
- (b) divider means for selectively releasing said microorganisms from said storage means into contact with said explosive material in said explosive device.

17. A method as recited in Claim 16, wherein said divider means comprises a removable barrier between said microorganisms and said quantity of said explosive material when said bioremediation apparatus is coupled to said explosive device.

18. A method as recited in Claim 17, wherein said barrier is removable mechanically.

19. A method as recited in Claim 17, wherein said barrier is removable electrically.

20. A method as recited in Claim 17, wherein said barrier is removable chemically.
21. A method as recited in Claim 16, wherein said bioremediation apparatus further comprises:
- (a) reservoir means for releasably containing a liquid capable of mobilizing said microorganisms; and
 - (b) separation means for selectively releasing said liquid from said reservoir means into said storage means.
22. A method as recited in Claim 13, wherein said bioremediation apparatus comprises:
- (a) reservoir means for releasably containing a liquid capable of mobilizing said microorganisms;
 - (b) storage means for releasably containing said microorganisms, said storage means being in selective communication with said reservoir means;
 - (c) first valve means for releasing said liquid from said reservoir means into said storage means in the open condition of said first valve means; and
 - (d) second valve means for releasing said microorganisms and said liquid into contact with said explosive material in said explosive apparatus when said explosive apparatus is coupled to said explosive device.
23. A method as recited in Claim 22, wherein said first valve means and said second valve means are operably interconnected.

24. A method for remediating an explosive device, if the explosive device once installed at a predetermined detonation site fails to detonate as intended, said method comprising the steps:

- (a) selecting an explosive material from which to form an explosive device;
- (b) identifying microorganisms capable of bioremediating said explosive material;
- (c) dispersing a quantity of said microorganisms in a quantity of said explosive material, thereby forming an explosive mixture with bioremediating capacity;
- (d) forming said explosive mixture into an explosive device; and
- (e) placing the explosive device at a predetermined detonation site, whereby said explosive material is bioremediated if said explosive device fails to detonate as intended.

25. A method as recited in Claim 24, further comprising the step of shaping said quantity of said microorganisms into aggregations having a form selected from the group consisting of a pellet, a capsule, a shard, a flake, a granule, a powder, and a clump.

26. A method as recited in Claim 25, wherein said microorganisms are dehydrated.

27. A method as recited in Claim 25, wherein said microorganisms are freeze dried.

28. A method as recited in Claim 25, wherein said aggregations further comprise a thermal protection additive.

29. A method as recited in Claim 24, wherein said explosive mixture in said explosive apparatus is porous.

30. A method as recited in Claim 24, further comprising the step of disposing said explosive mixture in a shell, and wherein said shell enables water from the exterior of said shell to flow through said shell into contact with said quantity of said explosive mixture.

31. A method as recited in Claim 29, wherein said shell is porous.

32. A method as recited in Claim 24, wherein said microorganisms are among a microorganism consortium identified at the American Type Culture Collection by ATCC Designation No. 555784.